REMARKS

A. OVERVIEW

Claims 1-43, 46-53, 55-56, and 58-62 are pending in the present application. Claims 1, 27, 32, 43, 45, 51, 53-63 are amended. Claims 5, 11, 29, 31, 51 are cancelled without prejudice to pursue them in a related application. The present response is an earnest effort to place all claims in proper form for allowance. Reconsideration and immediate passage to allowance are respectfully requested.

B. CLAIM OBJECTIONS

The present response renumbers the claims to remove the informality objection at page 2, numbered paragraphs 1 and 2 of the Office Action.

C. REJECTIONS UNDER 35 U.S.C. § 102

Claims 1, 5-10, and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by the "Trase Operating Instructions" or the alleged "Applicants' admitted prior art". Applicants respectfully traverse this rejection. "A prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently, to anticipate." Telemac Cellular Corp. v. Topp Telecom, Inc., 247 F.3d 1316, 1327 (Fed. Cir. 2001). "Under the principals of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates." Id.

The Trase Operating Instructions do not disclose utilization of its system to monitor drying of an agricultural media such as grain or seed, on or off its carrier. Applicants specification mentions the Trase-type TDR systems and acknowledges their existence. But Applicants know of no disclosure or teaching of utilization of such systems in the way set forth in their claims. Applicants' claims, therefore, have limitations not disclosed in the cited alleged

prior art of the Office Action. Therefore, it is respectfully submitted no showing has been made of anticipation by disclosure in the cited alleged prior art.

Regarding claims 1 and 15, numbered paragraph 6, pages 2-3 of the Office Action takes the position that known TDR devices, including those cited in Applicants' specification, inherently contain the limitations of those claims. This conclusion is respectfully traversed, and in particular, any implication that Applicants have admitted the same in the application is traversed.

Again, the cited portions of Applicants' specification relied upon by the Examiner, pages 34 and 40, are in the Detailed Description of the Exemplary Embodiments of Applicants' invention. This is not a discussion of prior art, but a description of a combination of components or steps for an exemplary embodiment of Applicants' invention. Therefore, the discussion of TDR and Applicants' detailed description of exemplary embodiments is the only suggestion of Applicants' claims, not the alleged prior art cited in the Office Action.

Secondly, claim 1 is a combination of steps. The combination includes derivation of moisture content by time domain reflectometry (TDR), but also, utilization of the same to monitor drying of the substance at issue. Applicants' submit they are the first to recognize and innovate an advance in the art of using TDR as a part of a method and apparatus to monitor an artificial drying process for grain or seed, whether on the carrier or off the carrier. They are not claiming invention of TDR as a way to measure moisture. The claims are a set of method steps or a combination of structural limitations of which TDR is one part. Patentability is alleged to reside in the innovation of the combination of steps or structure.

It is believed of assistance to refer to the background of the invention in the application. The motivation of the invention is explained there. A long-felt need has existed for a better way

of artificially drying large batches of seed or grain. It is not resource-effective to have workers reach in periodically, grab handfuls of grain from the dryer bin, take them to a lab, get moisture results, and use those to adjust heat or air to the drying bin. Many drying bins are simultaneously running. Many batches of seed are processed through these many bins.

Known methods attempting to automate sensing of moisture in the bins have various deficiencies or problems, as explained in Applicant's specification. The Applicants therefore had to look outside the state of art for a solution.

On the other hand, TDR existed in the literature but mainly for monitoring breaks in electrical cables or use with soil physics. TDR was not known, so to speak, to the seed drying art. It was not in the literature. The search for better seed drying system forced a look at side of the known ideas. And, there was no guidance, teaching, or knowledge as to how it might be applied or whether it even would work in the context of drying grain. For example, would it be accurate with grain, which has substantial space when packed in a drying bin between kernels? How could moisture readings from the interior of large bin be obtained with a small probe taught for use with soil physics TDR application? Would variations between seed, and when it was on its carrier (such as a corn on a cob) even allow its use? Would it function in an environment of tremendous size, weight, and variations in temperature (heat, air flow)? Applicants had to test, struggle with, and develop answers to these questions which took substantial time and effort.

Therefore, it is respectfully submitted that Applicants' claims not only are disclosed in the state of the art, but they are not inherent from it.

Again, it is instructive to look at the state of the art. Applicants' specification (e.g., pages 6-13) discusses the state-of-the-art of drying grain or seed. One method literally requires reaching in to the drying bin and pulling out samples. The samples are taken to a laboratory

setting where moisture content is derived. After the lab tests, the drying process is then altered, if needed. The lab tests for deriving moisture content are not known to include TDR. Volumetric or weight methods can be used.

Applicants' specification also discusses other non-TDR methods that have been attempted to measure moisture content in materials.

Applicants' specification also, in detail, discusses existing TDR applications. TDR either has traditionally been used to check for discontinuities in electrical cables or to measure moisture in soil for soil physics purposes.

The Hook patent is also described in Applicants' "Background of the Invention". Hook does briefly discuss utilizing its TDR system to derive moisture estimates for not only soil but other materials, and mentions grain and alcohol. However, it specifically and repeatedly references utilizing conventional soil TDR probes, of the same size and configuration but with electrical components that short parts of the probe. Furthermore, the only application of TDR to grain specifically mentioned in Hook is to put the probe at the air grain interface to detect level of grain in a silo. There is no disclosure or teaching or suggestion of utilizing TDR as a part of a method or system for monitoring drying of a grain or seed.

Inherency requires the alleged prior art to function in accordance with and include claim limitations of the claims at issue. Atlas Powder Company vs. Irego Inc., 190 F.3d 1342, 1347 (Fed. Cir. 1999). The functions and claim limitations must be recognized by those of ordinary skill in the art and not be just a probability or possibility. Id. To support inherency, the Examiner must show a clear basis in fact or technical reasons from which the alleged inherent function necessarily flows. Ex parte Levy, 17 U.S.P.Q.2d 1461, 1464 (BPAI 1990). The Federal Circuit has warned that inherency is a limited principle; that it provides "modest flexibility" to

the general rule that, under § 102, the cited prior art must explicitly disclose all the claimed limitations of the claim. Continental Can Co. USA, Inc. vs. Monsanto Co., 948 F.2d 1264, 1269 (Fed. Cir. 1991). The Federal Circuit held that this "modest flexibility" essentially is common knowledge of technologists in the relevant field which is not recorded in the reference, but also is not known to judges.

It is therefore respectfully submitted that none of the cited references provide a *prima facie* factual basis to support a conclusion that using TDR to measure moisture, and then using the moisture measurement to monitor drying, is explicit or inherent in the state of the art. As held in Rowe vs. Dorr, 112 F.3d 473, 478 (Fed. Cir. 1997), if the only thing the cited prior art does is not explicitly describe anything inconsistent with the claimed method, such a "negative pregnant" is not enough to establish inherency.

It is respectfully submitted that the only suggestion of claim 1 is in Applicants' specification. Hindsight gained by Applicants' disclosure is not a proper grounds for inherency. Therefore, it is respectfully submitted that there is no *prima facie* case of inherent anticipation by either Applicants' specification or the "Trase Operating Instructions". There is no showing that use of TDR to monitor drying is a necessary consequence or necessarily flows from conventional TDR principles. In fact, the "Trace Operating Instructions" have no suggestion even, as far as can be seen, of an application beyond inserting the small probe into the surface of soil. Hook likewise is focused on use for soil physics applications and its meager general reference to other materials including grain and alcohol, does not speak anything about monitoring a drying process for grain.

However, in an effort to advance prosecution of this application, claim 1 has been amended to essentially add in limitations found in original claims 5, 34, and 11. Claim 1 now

explicitly makes it clear the methodology applies to grain or seed "whether or not separated from a carrier or other vegetative structure". Claim 1 makes it clear the methodology is applied to a relatively large amount of grain or seed (as opposed to a small laboratory-size sample). And, claim 1 now makes it clear that moisture derivation is used to control an artificial drying process for the seed or grain.

There is no disclosure, teaching or suggestion in the "Trace Operating Instructions" or in the prior art discussed in Applicants' specification of using a TDR moisture measurement method to control artificial drying of a large volume of grain or seed. The Patent Statute, §§ 100 and 101, state that methods are patentable even if they utilize known apparatus. As discussed above, it is respectfully submitted that the "Trace Operating Instructions" do not teach or suggest use of Trace for controlling an artificial drying process, let alone deriving moisture content of grain or seed. It is precisely the realization of the inventors that they might be able to improve on seed or grain drying processes by using TDR as a way to autonomously derive moisture at relevant times, that led them to develop the claimed innovation. There was no teaching, suggestion, or realization in the state of the art that suggested it would be feasible. At best, the cited art on TDR teaches or suggests the TDR of the type disclosed might be used to derive moisture content of material by insertion of a small probe into the surface of the substance.

It is therefore respectfully submitted that a *prima facie* case of anticipation or § 102(b) has not been made out and the rejection of claim 1, as amended, should be withdrawn.

Claim 5 has been cancelled without prejudice, mooting that rejection.

Claims 6-10 are dependent from claim 1, as amended, and are submitted to be allowable for the reasons argued in support of claim 1.

Claim 15 is dependent on claim 1 and is submitted to be allowable for the reasons argued in support of claim 1.

D. REJECTION UNDER 35 U.S.C. § 103

Claims 2-4 are rejected under 35 U.S.C. § 103(a) as unpatentable over "Trase Operating Instructions" or the alleged "Applicants' admitted prior art". The PTO bears the burden of establishing a case of *prima facia* obviousness. In re Fine, 837 F.2d 1071, 1074 (Fed. Cir. 1988). It is axiomatic that in order to establish a *prima facia* case of obviousness, it is necessary for the Examiner to present evidence, preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art, that one having ordinary skill in the art would have been led to combine the relative teachings of the applied references in the proposed manner to arrive at the claimed invention. See e.g. Carella v. Starlight Archery, 804 F.2d 135 (Fed. Cir. 1986); Ashland Oil, Inc. v. Delta Resins and Refractories, Inc., 776 F.2d 281 (Fed. Cir. 1985). This suggestion cannot stem from the Applicants own disclosure, however. In re Ehrreich, 590 F.2d 902 (C.C.P.A. 1979). This rejection is respectfully traversed.

Please refer also to earlier in this response where a description of lack of teaching in the state of the art is set forth. Invention claimed herein was not in the literature at the time of the Applicants' invention, and there was no suggestion of the same. Thus, despite a long felt need, there was no solution in the art until this invention. Furthermore, there was no trivial application of TDR to the claimed invention. It took a lot of experimentation, and development, including across a wide variety of drying circumstances, to make the invention. Therefore, secondary indicia of nonobviousness exists regarding the invention.

Claims 2-4 are dependent on claim 1. They add in further limitations regarding the monitoring of drying. For the same reasons described above, it is respectfully submitted there is

no teaching or suggestion of these limitations in the cited art. The only reason or motivation to combine TDR technology with controlled and artificial drying process is in Applicants' disclosure as opposed to the cited art. It is therefore respectfully submitted there is not a *prima facie* case of obviousness under § 103. The state of the art describes TDR applications in soil physics applications and testing electrical cables for discontinuities. While the Hook patent mentions grain, it is limited to descriptions of using TDR to show height of grain in a silo. At most it suggests TDR might be used to measure moisture content with a small soil type probe. It does not suggest utilizing TDR moisture measurements to control artificial drying of a batch of seed or grain. TDR art is becoming more developed. However, at the time of the invention, there is no teaching or suggestion of its use in the methodology of Applicants' claims.

Claims 11-14 and 22-63 are rejected under 35 U.S.C. § 103(a) as unpatentable over the "Trase Operating Instructions" or the alleged "applicant's admitted prior art" in view of Hunter et al. (U.S. 5,893,218). "[U]nder § 103, teachings of references can be combined only if there is some suggestion or incentive to do so." ACS Hospital Sys., Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577 (Fed. Cir. 1984). This rejection is respectfully traversed. There is no suggestion to combine these two references.

Claims 11, 29, 31, and 51 have been cancelled thereby mooting these rejections. With regard to claims 12-14, and 22-26, such claims are dependent from claim 1 and believed allowable for the reasons expressed in support of claim 1.

Claim 27 is an independent method claim. It has been amended to add limitations such as discussed regarding amended claim 1.

Claim 32 is an independent apparatus claim. It has been amended to add limitations analogous to those added to claim 1. It is respectfully submitted that the cited art does not teach or suggest the combination of limitations in apparatus claim 32.

Claim 43 is also an apparatus claim and has limitations similar to claim 32. It is respectfully submitted that apparatus claims 32 and 43, and all dependent claims therefrom, are not obvious and are allowable for the reasons expressed previously regarding claim 1. No cited art discloses, teaches or suggests a combination of limitations in an apparatus where the system is used to control an artificial drying process.

Claim 61 is an independent apparatus claim. It specifically relates to a probe used for artificial drying of seed or grain. It defines a combination of a bin or chamber for the seed or grain and a probe that extends a substantial distance into the material in the bin or chamber. It also includes specific limitations of a structural support to support the probe in a bin or chamber. None of the prior art of record discloses such a combination. Again, the cited art discloses small (e.g. 10 to 40 cm.) long probes that can be pushed into the surface of soil. None speak to the issues of installing a probe into seed or grain that weigh many tons. It is respectfully submitted claims 62 and 63, dependent from claim 61, are also allowable.

Claims 16-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over "Trase Operating Instructions" or alleged "applicant's admitted prior art" in view of Hook (US 5,376,888). This rejection is respectfully traversed. Claims 16-21 are dependent upon claim 1 and are submitted to be allowable for the same reasons expressed in support of the other claims in this application.

E. CONCLUSION

It is respectfully submitted that claims, as amended, are in allowable form. The specific combination of method steps or structure in Applicants' claims are not disclosed, inherent, or obvious from any of the cited references. The invention has made a significant and valuable advance in the art of artificial drying of seed or grain. There is simply no showing that application of TDR into that art was suggested or inherent at the time of the invention.

It is respectfully submitted all matters raised in the Office Action have been addressed and remedied and that the application is in form for allowance. Favorable action is respectfully requested.

No fees or extensions of time are believed to be due in connection with this amendment; however, consider this a request for any extension inadvertently omitted, and charge any additional fees to Deposit Account No. 26-0084.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,

MARK D. HANSING, Reg. No. 30,643
McKEE, VOORHEES & SEASE, P.L.C.
801 Grand Avenue, Suite 3200
Des Moines, Iowa 50309-2721
Phone No: (515) 288-3667
Fax No: (515) 288-1338
CUSTOMER NO: 27142

Attorneys of Record

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